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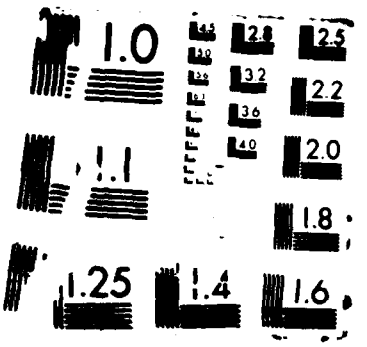
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PRELIMINARY INVENTORY OF PLANKTONIC AND BENTHIC ORGANISMS AT TIMES BEACH

Short communication

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CONTENTS

1. INTRODUCTION

Times Beach, the confined disposal site for dredged material at Buffalo, N.Y., was created in 1972 and used until 1976. The site was not filled to its full capacity, resulting in an upland, a wetland and an aquatic area, which were rapidly invaded by plants and animals.

By 1983, when studies were initiated, this invasion had resulted in established ecosystems. The first studies were directed towards contaminant biomobility at the site (Marquenie et al., 1983) and succession of terrestrial plant communities (Wilhelm, 1983).

In 1985 a workshop (4th meeting of the international contaminant biomobility working group) was devoted to Times Beach. In this workshop it was stated that in addition to the study of floristic succession, faunal inventories should be conducted in order to identify key species for further research.

Several inventories were initiated in 1985:

- Dr. Elizabeth Stafford, of the Rothamsted Experimental Station, studied the occurrence of soil dwelling invertebrates in May and September 1985.
- Dr. Edward Neuhauser, of Cornell University, studied the occurrence of small rodents in autumn 1985.
- Dr. Andrle, of the Museum of Natural History, Buffalo, has been following the usage of Times Beach by birds since May 1985.
- Mr. Don Crawley, Dr. Stratford Kay and Drs. Joop Marquenie collected and identified earthworm species along transects at Times Beach in May and June 1985. In addition to a fish survey in 1983, they also conducted fish surveys in June 1985.

This communication reports the occurrence of invertebrates in the aquatic portion of Times Beach and Lake Erie. The study is intended as a very general inventory for the purpose of finding groups of possible toxicological interest.

2. MATERIALS AND METHODS

Plankton was collected at four stations, two in Lake Erie outside the dike enclosing Times Beach, and two inside the dike. Each sample was composed of three equal hauls of about 5 metres with a standard plankton net (50 µm, 30 cm diameter).

Plankton was preserved in formalin (4%). Samples were diluted to 10 ml, and a 1 ml subsample was counted.

Sediment samples from the Typha edge were sieved over a 0.5 mm sieve, and the animals collected were also preserved in formalin.

3. RESULTS

The results of the plankton hauls are shown in Table 1, and those of the sieving of sediments in Table 2.

Table 1 Results of planktonic surveys at Times Beach and Lake Erie, May 1985. - = absent, // = several species.

Taxonomic group	Lake Erie		Times Beach	
	sta. 1	sta. 2	sta. 3	sta. 4
Chlorphyta				
Ulotrichales	abundant	abundant	abundant	-
Zygnomales	-	some	-	-
Pediastrum spec.	-	-	1	8
Chrysophyta				
Tabelaria spec.	-	-	-	18
Asterionella spec.	-	-	4	39
Dinoflagelata				
Ceratium spec.	1	-	35	517
Rotatoria				
several species	8	3/8	7/2/4/1	25/11
Cladocera				
Ceriodaphnia spec.	3	11	8	-
Bosmina spec.	6	3	33	3
Copepoda				
Harpacticoida	214	51	440	63
Cycloptoida	10	4	1	28
Ostracoda				
several species	2	4	2	1

Table 2 Results of benthic surveys at Times Beach.

Taxonomic group
Annelida
Oligochaeta (some)
Hiudinea (abundant)
Gastropoda
Lymnea (abundant)
several species (abundant)
Bivalvia
Sphearidae (some)
Copepoda
Lerneaeopodoida (abundant)
Amphipoda
1 species (some)
Decapoda
1 species (some)
Insecta
Ephemeroptera (some)
Diptera (abundant)

3. DISCUSSION AND CONCLUSIONS

The surveys were of a very general nature, with no other purpose then to get an initial impression of abundance of species and numbers of organisms. In this respect the surveys were successful.

Apparently, Times Beach is rich in species and biomass, even more so than the adjacent part of Lake Erie. Whether this is really the case can only be assessed through a proper quantitative full year sampling programme in which organisms are identified at the species level.
Such a programme will certainly identify seasonal cycles in species diversity and productivity. It may also enable us to relate such findings to other areas (for instance Lake Erie) in a significant way. But it is doubtful whether it will also reveal any influence of the contaminants present in the sediments.

Several species within the taxonomic groups found at Times Beach are known from toxicological research.
Daphnids probably are the most intensively used group of organisms for ecotoxicological test. *Daphnia magna* is the most frequently used species of daphnids, but *Ceriodaphnids* may also be useful.
Lymnea is used in toxicological studies and in studies dealing with mutgenic compounds. The species most frequently used is *Lymnaea stagnalis*. The species encountered at Times Beach probably is *Lymnaea ovata*.
Oligocheata, *Tubifex tubifex*, are used in ecotoxicological tests. Their use, however, seems to be restricted.
A last group of wide ecotoxicological significance are the midges. Their larvae are predated by fish, and the adults by a large number of other species, including birds. Several species have larvae that live in sediments. Simple tests are available to test normal development and emergence of the adults (Prater, 1975).
Surveys in the Netherlands with this type of larvae collected from contaminated sediments showed varying degrees of malformations. In order to assess whether such malformations also occur in larvae collected from Times Beach, these specimens were sent to a local expert. This study will be reported later.

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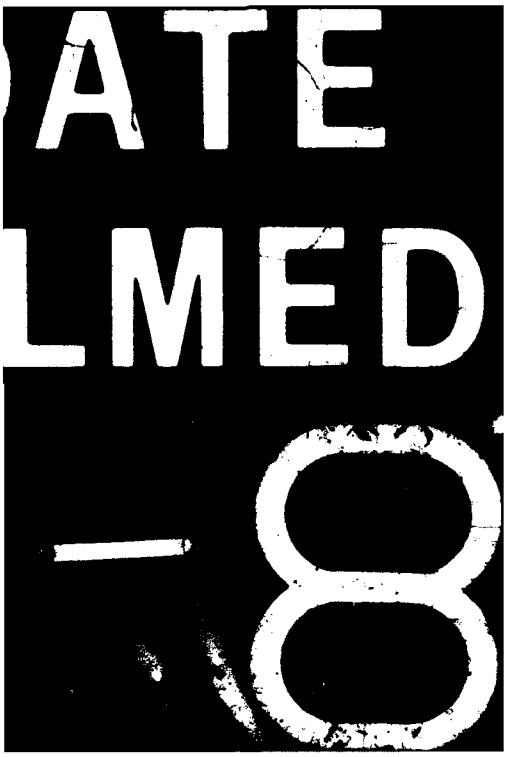
Appendices 1: R 87/023 Proceedings of the 1984 Workshop, held at Buffalo, USA

2: R 86/199 Musselwatching in the Buffalo River, Times Beach and Lake Erie

3: R 86/220 Preliminary inventory of planktonic and benthic organisms at Times Beach

4: P 85/50 Animal bioassays of black rock harbor sediments - Field verification at an experimental wetland-creation disposal site

5: P 87/007 Morton Arboretum Bioassays.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